

Atty. Docket No.: BLPJ.P001

Patent 09/825,589

**REMARKS**

Claims 1-44 are pending in the application. Claims 1, 14, 29 and 42 have been amended. No claims have been canceled. No claims have been allowed.

***Rejections under 35 U.S.C. § 103***

A. Amended claim 1 and claims 2-5, and 7-11 would not have been obvious in view of USPN 5,185,780 and USPN 6,823,315

Claims 1-5, 7-11, 14-20, 22-26, 29-33 and 35-39 were rejected under 35 U.S.C. § 103(a) as being unpatentable over USPN 5,185,780 to Leggett (hereinafter "the '780 patent") in view of USPN 6,823,315 to Bucci et al. (hereinafter "the '315 patent").

In light of the foregoing claim amendments, Applicants respectfully traverse the rejections under 35 U.S.C. § 103(a).

As amended, claim 1 recites a computer-implemented method for generating a schedule for a plurality of employees with varying skill sets for a time period, wherein the plurality of employees have varying overlapping skill sets that enable them to perform various tasks, and wherein employees are shared across tasks within the time period, the method comprising receiving a plurality of user inputs to a scheduling program, including a number of employee designations that each refer to a unique employee, and a number of skill sets that each correspond to one of the employee designations; and during the method for generating the schedule, determining an effect on the schedule of an incremental change to the plurality of user inputs, including, receiving a user input that changes the number of employee designations by indicating at least one changed employee; estimating an effect of the at least one changed employee on effective staffing levels for each of the various tasks, wherein the estimating uses as an input a skill set associated with the at least one changed employee; determining whether to simulate the schedule based at least in part on an adaptive algorithm; and generating estimated effective staffing levels for each of the various tasks.

The '780 patent does not teach or suggest a computer-implemented method for generating a schedule, as recited in amended claim 1. Instead, the '780 patent describes a method for predicting a number of agents required to provide a given service level in a

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force management system. The force management system is described as having the capability to generate call handling performance data including average call arrival rate and average handling time per call. The described method calculates an offered load equal to the average arrival rate of calls for the system multiplied by the average handling time per call. The calculated offered load is used to calculate two predictor values which are used in successive Erlang C calculations to locate the number of agents required to provide a given service level.

Applicants respectfully submit that those skilled in the art recognize that the Erlang-C method described in the '780 patent provides an inadequate solution to the skills-based scheduling case (see the Learnon reference page 88 describing breakdown of Erlang-C assumption in skills-based call routing). The '780 patent does not teach or suggest generating a schedule for a plurality of employees with varying skill sets for a time period, wherein the plurality of employees have varying overlapping skill sets that enable them to perform various tasks, and wherein employees are shared across tasks within the time period.

The Office Action appears to ignore limitations of claim 1 when making the rejection thereof. For example, in rejecting claim 1, at page 2, paragraph 4, the Office Action states that

"Leggett teaches: receiving a plurality of user inputs to a scheduling program including a number of employee designations that each refer to a unique employee,....".

The Office Action ignores the remaining text of this limitation in rejecting the claim. This is impermissible. This element of claim 1 recites:

"receiving a plurality of user inputs to a scheduling program, including a number of employee designations that each refer to a unique employee, and a number of skill sets that each correspond to one of the employee designations;"

To make a *prima facie* case of obviousness, the Office Action must examine each and every limitation of a rejected claim. That is, the Office Action appears to reject the claims without examining the totality of each claim, including each and every limitation of the claims.

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As further example, the '780 patent does not teach or suggest a computer-implemented method as recited in claim 1, including the limitation of estimating an effect of the at least one changed employee on effective staffing levels for each of the various tasks, wherein the estimating uses as an input a skill set associated with the at least one changed employee. The Office Action states on page 3, sixth full paragraph that,

"column 13 line 3-5, Leggetts' method estimates the effect that adding an incremental worker (i.e. changed worker) will have on the staffing levels for each of the calls (i.e. tasks). The algorithm increments or decrements the number of agents to determine the number of agents to achieve a particular staffing level."

Applicants respectfully disagree that this passage of Leggett teaches a method that estimates the effect that adding an incremental worker (i.e. changed worker) will have on the staffing levels for each of the calls (i.e. tasks).

Leggett, at column 13, lines 3-5 recite:

"...with "n" agents is  $(100 - PW_{tn})$ ;  $PW_{tn1}$  is the percentage of calls that wait more than "t" seconds if there are "n+1" agents. At step 79, a test is run to determine..."

This section is describing the process of predicting a number of agents required to provide a given service level. (See column 12, lines 40-44.)

In contrast, amended claim 1 recites estimating an effect of the at least one changed employee on effective staffing levels for each of the various tasks, wherein the estimating uses as an input a skill set associated with the at least one changed employee. The cited passage clearly teaches no such limitation. Finally, in addition to the above, the '780 patent does not teach or suggest determining whether to simulate the schedule based at least in part on an adaptive algorithm, as recited in amended claim 1.

The '315 patent does not compensate for the deficient teaching of the '780 patent. The '315 patent describes a dynamic workforce scheduler that uses a simulated annealing function while considering employee preferences such as preferred hours, preferred jobs, etc., as well as employee job skills. The schedule must comply with certain constraints, such as hours rules, minor rules, break rules, etc. The described method for generating a schedule takes into account preexisting rules and constraints. The method includes a simulated annealing process that includes determining whether a

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current schedule iteration is better than a previous schedule iteration in an attempt to find a best schedule.

The '315 patent does not teach or suggest a computer-implemented method of generating a schedule, as recited in amended claim 1. For example, the '315 patent does not teach or suggest generating a schedule for a plurality of employees with varying skill sets for a time period, wherein the plurality of employees have varying overlapping skill sets that enable them to perform various tasks, and wherein employees are shared across tasks within the time period. As further example, the '315 patent does not teach or suggest a computer-implemented method of generating a schedule including the limitations of estimating an effect of the at least one changed employee on effective staffing levels for each of the various tasks, wherein the estimating uses as an input a skill set associated with the at least one changed employee. Additionally, the '315 patent also does not teach or suggest determining whether to simulate the schedule based at least in part on an adaptive algorithm.

In addition, one of ordinary skill in the art would find no motivation to combine the references as suggested. For example, the '780 patent is directed to a method for predicting agent requirements in a force management system and is classified in U.S. class 379. To the contrary, the '315 patent is directed to a method for processing preexisting rules and constraints to iteratively generate schedules and determine which schedule is the "best" and is classified in U.S. class 705. Applicants further submit that the suggested combination does not result in the method as claimed in amended claim 1, and one skilled in the art would find no suggestion or motivation to combine the two references. Thus, the Office Action fails to provide a *prima facie* case of obviousness since the combined teaching of the '780 and '315 patents do not teach or suggest all of the limitations recited in claim 1. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 2-5 and 7-11 depend from claim 1 and include further limitations thereon. Therefore, Applicants respectfully submit that claims 2-5 and 7-11 similarly would not have been obvious to one of ordinary skill in the art in view of the cited references.

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B. Amended claim 14 and claims 15-20 and 22-26 would not have been obvious in view of USPN 5,185,780 and USPN 6,823,315

Amended claim 14 is directed to a system for generating a schedule for a plurality of employees with varying skill sets for a time period, wherein the plurality of employees have varying overlapping skill sets that enable them to perform various tasks, and wherein employees are shared across tasks within the time period. Claim 14 further recites: at least one server comprising at least one storage device; at least one client processor coupled to the server through a network, wherein the client processor is coupled to a plurality of storage devices, including a storage device that stores instructions that, when executed, cause the at least one client processor to, receive a plurality of user inputs to a scheduling program, including a number of employee designations that each refer to a unique employee, and a number of skill sets that each correspond to one of the employee designations; and during execution of the scheduling program, determine an effect on the schedule of an incremental change to the plurality of user inputs, including, receive a user input that changes the number of employee designations by indicating at least one changed employee; estimate an effect of the at least one changed employee on effective staffing levels for each of the various tasks, including estimating using as an input a skill set associated with the at least one changed employee; determine whether to simulate the schedule based at least in part on an adaptive algorithm; and generate estimated effective staffing levels for each of the various tasks.

Applicants respectfully submit that the '780 and '315 patents, alone or in combination, fail to teach or suggest a system for generating a schedule for a plurality of employees with varying skill sets for a time period, wherein the plurality of employees have varying overlapping skill sets that enable them to perform various tasks, and wherein employees are shared across tasks within the time period. The deficient teachings of the '780 and '315 patents are described in detail above with regard to the rejection of claim 1. Applicants respectfully submit that the remarks with reference to amended claim 1 also apply to amended claim 14.

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For example, the references, alone or in combination, do not teach or suggest a system for generating a schedule which executes a scheduling program including a limitation to estimate an effect of the at least one changed employee on effective staffing levels for each of the various tasks, including estimating an effect of the at least one changed employee on effective staffing levels for each of the various tasks, wherein the estimating uses as an input a skill set associated with the at least one changed employee. As further example, the references, alone or in combination, do not teach or suggest a system for generating a schedule including a further limitation of the scheduling program determining whether to simulate the schedule based at least in part on an adaptive algorithm.

For at least these reasons, Applicants respectfully submit that amended claim 14 would not have been obvious to one of ordinary skill in the art in view of the teachings of the '780 and '315 patents. Moreover, the Office Action does not provide a *prima facie* case of obviousness with respect to amended claim 14 since the combined teaching of the '780 and '315 patents do not teach or suggest all of the limitations recited in claim 14. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 15-20 and 22-26 depend from claim 14 and include further limitations thereon. Therefore, Applicants respectfully submit that claims 15-20 and 22-26 would not have been obvious to one of ordinary skill in the art in view of the cited references.

C. Amended claim 29 and claims 30-33 and 35-39 would not have been obvious in view of USPN 5,185,780 and USPN 6,823,315

Amended claim 29 is directed to an electromagnetic medium containing executable instructions which, when executed in a processing system, cause the system to generate a schedule for a plurality of employees with varying skill sets for a time period, wherein generating the schedule and includes: receiving a plurality of user inputs to a scheduling program, including a number of employee designations that each refer to a unique employee, and a number of skill sets that each correspond to one of the employee designations; and during execution of the scheduling program, determining an effect on the schedule of an incremental change to the plurality of user inputs, including, receiving a user input that changes the number of employee designations by indicating at

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least one changed employee; estimating an effect of the at least one changed employee on effective staffing levels for each of the various tasks, wherein the estimating uses as an input a skill set associated with the at least one changed employee; determining whether to simulate the schedule based at least in part on an adaptive algorithm; and generating estimated effective staffing levels for each of the various tasks.

Applicants respectfully submit that the '780 and '315 patents, alone or in combination, fail to teach or suggest a system, as claimed in amended claim 29, for generating a schedule for a plurality of employees with varying skill sets for a time period, wherein the plurality of employees have varying overlapping skill sets that enable them to perform various tasks, and wherein employees are shared across tasks within the time period. Again, the deficient teachings of the '780 and '315 patents are described in detail above with regard to the rejections of claims 1 and 14, and need not be repeated again. Applicants' arguments with reference to amended claims 1 and 14 and the cited art are also applicable to amended claim 29. For at least these reasons, Applicants respectfully submit that amended claim 29 is not made obvious by the combined teaching of the '780 and '315 patents and the Office Action does not provide a *prima facie* case of obviousness with respect to amended claim 29. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 30-33 and 35-39 depend from claim 29 and include further limitations thereon. Therefore, Applicants respectfully submit that claims 30-33 and 35-39 would not have been obvious to one of ordinary skill in the art in view of the cited references.

D. Dependent claims 12-13, 27-28, and 40-41 are not made obvious by USPN 5,185,780, USPN 6,823,315, and White

Dependent claims 12-13, 27-28, and 40-41 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the '780 patent in view of the '315 patent and further in view of White, Ron, "How Computers Work – Millennium Edition", 1999, Macmillan Computer Publishing (hereinafter "the White reference").

The rejections of amended independent claims 1, 14, and 29, from which claims 12-13, 27-28, and 40-41 depend, respectively, are described in detail above. Applicants

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submit that the White reference does not compensate for the deficient teaching of the '780 and '315 patents with respect to amended independent claims 1, 14, and 29.

The White reference describes parallel processing as a cheap way to multiply computing power. Parallel processing uses a plurality of processors operating in parallel to process different information. Other than a simple description of parallel processing, the White reference provides no other relevant detail. Additionally, the White reference does not teach or suggest dividing a schedule into time intervals such that a schedule for each of the time intervals is processed by a different processor, as claimed in claims 12, 27, and 40. The White reference also does not teach or suggest performing the scheduling process on one processor, and performing simulation on multiple different processors as claimed in claim 13, 28, and 41. It is clear that the Office Action is impermissibly using hindsight reconstruction and Applicants' disclosure and conclusory statements in applying the White reference to reject these claims. This is improper.

Moreover, the White reference does not compensate for the deficient teaching of the '780 and '315 patents with respect to amended independent claims 1, 14, and 29. Thus, the combination of the White reference and the '780 and '315 patents does not make obvious independent claims 1, 14, and 29. Claims 12-13, 27-28, and 40-41 depend from claims 1, 14, and 29, respectively, and include further limitations thereon. Therefore, Applicants respectfully submit that claims 12-13, 27-28, and 40-41 would not have been obvious to one of ordinary skill in the art in view of the cited references.

E. Dependent claims 6, 21, and 34 would not have been obvious by USPN 5,185,780, USPN 6,823,315, and Leamon

Dependent claims 6, 21 and 34 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the '780 patent in view of the '315 patent and further in view of Leamon, Paul, "Workforce Management with Skills-Based Call Routing: The New Challenge", March 1999, Call Center Solutions, pp. 88-93 (hereinafter "the Leamon reference").

The Leamon reference describes skills-based call routing and the associated complexity of creating forecasts and schedules. Various methods are described to create schedules for skills-based call routing. However, Applicants submit that the Leamon



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reference does not compensate for the deficient teaching of the '780 and '315 patents with respect to amended independent claims 1, 14, and 29. The rejections of amended independent claims 1, 14, and 29, from which claims 6, 21, and 34 depend, respectively, are described in detail above, and are incorporated in this discussion of claim 6, 21, and 34. Applicants respectfully submit that Leamon combined with the '780 and '315 patents does not make obvious dependent claims 6, 21, and 34

Regarding claim 6, Applicants respectfully disagree that the '780 patent teaches or suggests the limitations of claims 1, 3, and 4 from which claim 6 depends. For example, the '780 patent does not teach or suggest the limitations of claim 1 and also determining a number of changes that can be made to a schedule during the scheduling method without simulating a proposed schedule, wherein determining includes comparing a predetermined amount of allowed error and a cumulative error that results from estimating by calculating a total effective work a changed employee will perform; scaling each task by at least one predetermined factor; and adjusting a work distribution for every unique employee other than the changed employee based upon the total effective work the changed employee will perform.

Additionally, Leamon does not teach or suggest the claimed limitation wherein at least one predetermined factor includes a measure of average time to handle a subtask divided by a number of subtasks per time interval, and a measure of how much work remains in a task based upon results of a previous simulation. The cited passage of Leamon states that the preferred solution embeds a simulator into the scheduling program, which allows the scheduling program to automatically generate schedules, simulate network and ACD call routing, analyze the results, determine changes to schedules and adjust schedules to determine the best answer. In addition to the Leamon's deficient teaching with respect to claims 1, and 3-4, this passage does not teach or suggest the claimed limitation of claim 6 wherein at least one predetermined factor includes a measure of average time to handle a subtask divided by a number of subtasks per time interval, and a measure of how much work remains in a task based upon results of a previous simulation. Similar reasoning applies to the application of Leamon to claims 21 and 34.

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Furthermore, as stated above, Applicants submit that the Leamon reference does not supplement the deficient teaching of the '780 and '315 patents with respect to claims 1, 3-4, 14, 19, 21, 29, and 31-32. As described on the first page of the Leamon reference, it is stated that the Erlang-C assumption is not valid for skills-based call routing. On pp. 1-2, the Leamon reference states that the Erlang-C can be used as a single step in the process of calculating agent requirements for skills-based call routing. However, the Leamon reference goes on to state that the Erlang-C calculation makes an incorrect assumption in the skills-based context. Thus, one of ordinary skill in the art would not be motivated to combine Leamon and the '780 patent, since the '780 patent describes using successive Erlang-C calculations to locate a desired number of agents to provide a given service level. For at least these reasons, Applicants request withdrawal of the rejections to claims 6, 21, and 34.

F. Claims 42-44 would not have been obvious in view of Blue Pumpkin's PrimeTime Call Center software product as disclosed in the cited reference

Claims 42-44 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the '780 patent in view of Blue Pumpkin's PrimeTime Call Center software product as disclosed in TMC Labs, "PrimeTime Enterprise Receives Editors' Choice", July 1999, Call Center Solutions, pp. 1-6 ([http://archive.bibalex.org/web/20000229044631/blue-pumpkin.com/reviews/ccs0799\\_edc\\_choice.html](http://archive.bibalex.org/web/20000229044631/blue-pumpkin.com/reviews/ccs0799_edc_choice.html)) (hereinafter "reference U1"), and Monegain, Bernie, "Avis Takes Charge of Airport Staffing", March 2000, Call Center News, pp. 1-2 (<http://archive.bibalex.org/web/20000520211508/blue-pumpkin.com/reviews/ccnews0300.html>) (hereinafter "reference V1").

Applicants appreciate the Examiner's acknowledgment in a telephonic communication that the "Leggett" reference on page 20 of the Office Action is a typo and the rejection of claims 42-44 are based solely on the combination of the U1 and V1 references.

Amended claim 42 recites a computer-implemented method for generating a schedule for a plurality of employees with various overlapping skill sets, the method comprising: initiating an automatic scheduling process that receives employee data including skill sets as an input; determining whether to simulate a proposed schedule,

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including measuring a cumulative error of using an estimation function from results of the simulation, and a predetermined allowed error; if it is determined not to simulate the proposed schedule, continuing with the method including evaluating and outputting the proposed schedule; determining whether a change has been made to the employee data; if a change has been made to the employee data, calculating an effective change to staffing levels, wherein the calculating includes estimating an effect of at least one changed employee on the effective change to staffing levels for a number of various tasks, wherein the estimating uses as an input a skill set associated with the at least one changed employee; and continuing with the method including evaluating and outputting the proposed schedule.

Applicants respectfully submit that amended claim 42 is not made obvious by the combined teachings of references U1 and V1. Reference U1 is a review of Blue Pumpkin's PrimeTime Enterprise workforce management software. Reference U1 comments on a skills-based scheduling add-on that can be used to link agent skills to automated call distributor (ACD) queues so the appropriate agent can take calls on a specific subject. Reference V1 describes how Avis Rent A Car Inc. uses call center technology (Blue Pumpkin's PrimeTime software) to handle staffing issues. No detail is given regarding the operational construct of the PrimeTime software.

The references, alone or in combination, do not teach a method as recited in amended claim 42. For example, the references do not teach or suggest determining whether to simulate a proposed schedule, including measuring a cumulative error of using an estimation function from results of the simulation, and a predetermined allowed error. Applicants respectfully disagree with the Office Action's characterization of reference U1. The passage at page 4, paragraph 5, does not teach or suggest the claimed limitation. Contrary to what the Office Action states, the passage of reference U1 at page 4, paragraph 2, recites:

"The campaign mode is where the call center manager schedules and forecasts on a weekly basis and manages campaigns."

The Office Action also states that at page 5, paragraph 5, the U1 reference describes the limitation that if it is determined not to simulate the proposed schedule,

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continuing with the method including evaluating and outputting the proposed schedule. Again, Applicants disagree. Reference U1 at page 5, paragraph 5, states:

"Finally, after the entire system was set up, we were ready to actually schedule the campaign week based on the data we entered. We entered the calendar module in the campaign mode, recalculated the statistics by pressing the second-to-last button of the toolbar on the right side of the screen, and entered the scheduler set up (fourth-to-last button from the right side). We accepted the default settings listed. Moments later, the schedule was set. One of the best parts of this functionality is that if there is a problem with the schedule, PrimeTime Enterprise alerts you to it with an intuitive dialog box that helps you solve the problem. This is beneficial for call center managers, no matter how proficient they are."

This passage does not provide the limitation above. Applicants further submit that the references do not teach or suggest determining whether a change has been made to the employee data, and if a change has been made to the employee data, calculating an effective change to staffing levels, wherein the calculating includes estimating an effect of at least one changed employee on the effective change to staffing levels for a number of various tasks, wherein the estimating uses as an input a skill set associated with the at least one changed employee.

The Office Action goes on to state on page 22 that:

"Official Notice is taken it is old and well known in the art of forecasting for the techniques of linear regress to be used... The use of regression analysis as a forecasting techniques is old an well known in the art and fully meets the claim limitations."

While this may be true, the conclusory statement does not compensate for the deficient teaching of the references with respect to amended claim 42. In the context of claim 42 the limitation states "determining whether to simulate a proposed schedule, including measuring a cumulative error of using an estimation function from results of the simulation, and a predetermined allowed error." The conclusory statement does not teach or describe this limitation in the context of amended claim 42.

Based on the foregoing, Applicants submit that amended claim 42 is patentable over the cited references, since the references, alone or in combination, do not teach or describe a method as claimed in amended claim 42. For at least these reasons, Applicants respectfully request withdrawal of this rejection.

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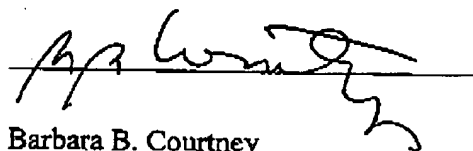
Claims 43-44 depend from claim 42 and include further limitations thereon. Therefore, based at least on the reasons above, Applicants respectfully submit that claims 43-44 would not have been obvious to one of ordinary skill in the art in view of the cited references.

### CONCLUSION

In view of the foregoing amendments and remarks, Applicants respectfully submit that claims 1-44 are in condition for allowance. The allowance of the claims is earnestly requested. The Examiner is invited to call the undersigned if there are any issues that remain to be resolved prior to allowance of the claims.

Respectfully submitted,

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